

combination of FEC (Forward error correction) with an ARQ protocol. This avoids overprotection of the information by too much FEC or excessive transmission power. Typically, radio block errors of 1% - 20% are a preferable operation range. Although link layer ARQ is a very efficient technique to save
5 radio resources, currently, no link layer ARQ for point to multipoint radio transmission exists.

Summary and description of the invention

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It is an object of the present invention to obviate the above disadvantages and provide a method and devices for a reliable point-to-multipoint data transmission in a mobile communication system. It is a further object, to allow a configuration of the link reliability. It is a still another object, to allow an effective
15 use of radio resources.

According to the invention, the method described in claim 1 is performed. Furthermore, the invention is embodied in a transmitter as described in claim 15 and a computer program as described in claim 16. Advantageous embodiments
20 are described in the further claims.

The proposed method concerns a data transmission in a mobile communication system. Data is transmitted in data blocks from a transmitter to a plurality of receivers, i.e. the data blocks are sent in a multicast transmission to all
25 receivers in the plurality without replication. Typically, all receivers are located in the same cell of a cellular communication system. To allow a retransmission in case of erroneous, i.e. missing or incorrectly received, data blocks, the data blocks are identifiable by an identification, e.g. a sequence number. The receivers are adapted to determine whether a data block is erroneous and to
30 send status indications to the transmitter whether a data block is correctly received. The status indications can identify either erroneous or correctly

Claims

1. A method for a data transmission in a mobile communication system,
5 wherein data is transmitted in data blocks (PDU) from a transmitter (T) to
a plurality of receivers (R1 – RM), said data blocks (PDU) being
identifiable by an identification, wherein the receivers (R1 – RM) send
status indications to the transmitter (T) whether a data block (PDU) is
correctly received, and wherein the transmitter (T) is adapted to perform
10 retransmissions according to the status indications and the transmitter
(T) is provided with a transmission window comprising the transmission
status for the data blocks (PDU) according to their identification, wherein
a synchronization to the transmitter (T) is performed for at least one first
of said receivers (Ri), wherein a range of identifications of transmitted
15 data blocks (PDU) is selected in said synchronization;
the transmitter (T) deletes the transmission status for the selected range
of identifications from the transmitter window; and
the first receiver (Ri) stops sending status indications for the data blocks
(PDU) corresponding to the selected range of identifications.
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2. The method according to claim 1, wherein the synchronization is
performed by a synchronization message between the transmitter (T)
and the first receiver (Ri).
- 25 3. The method according to claim 2, wherein the synchronization message
(MRW) is sent from the transmitter to all receivers in the plurality.
4. The method according to claim 2 or 3, wherein the synchronization
message is sent to at least two receivers (Ri), the receivers (Ri) send an
30 acknowledgement for the synchronization message, and the status
indications corresponding to the selected range of identifications are

deleted from the transmitter window after the acknowledgements are received from a predefined fraction of the receivers (Ri).

- 5 5. The method according to claim 2, wherein the synchronization message is sent by the first receiver (Ri).
6. The method according to any preceding claim, wherein synchronization events are defined for the transmitter (T) and the first receiver (Ri) and the synchronization is performed at the defined synchronization events.
- 10 7. The method according to any preceding claim, wherein the identifications of the data blocks (PDU) are sequence numbers and the sequence numbers identify the data blocks (PDU) in a modulo numbering scheme.
- 15 8. The method according to any preceding claim, wherein the receivers (R1 - RM) have a receiver window comprising identifications of data blocks (PDU), which are not correctly received, the receiver window having at least one edge, and wherein the edge of the receiver window is moved in the synchronization.
- 20 9. The method according to any preceding claim, wherein the transmission window comprises a cumulative transmission status for the identifications of the data blocks, wherein the cumulative transmission status is determined from the status indications sent by the receivers (R1 - RM) in said plurality.
- 25 10. The method according to any preceding claim, wherein the status indications from the receivers (R1 - RM) cumulatively acknowledge groups of correctly received data blocks.

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11. The method according to any preceding claim, wherein the receivers (R1 - RM) indicate the transmission status in a status message (STATUS) and the transmitter requests the status message (STATUS) with a poll message (POLL).
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12. The method according to claim 11, wherein the receivers (R1 - RM) send the status message (STATUS) in reply to the poll message (POLL) with a random delay.
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13. The method according to any preceding claim, wherein a receiver joins or leaves the data transmission and the transmitter receives a notification of the joining or leaving.
14. The method according to any of the claim 2 to 13, wherein the
- 15 synchronization message identifies a valid selected range of identifications to a receiver joining the data transmission.
15. A transmitter for a mobile communication system, wherein the transmitter is adapted to transmit data blocks (PDU) to a plurality of receivers (R1 - RM), said data blocks (PDU) being identifiable by an identification, and to receive status indications from the receivers (R1 - RM) whether a data block (PDU) is correctly transmitted, and wherein the transmitter (T) is provided with a transmission window comprising the transmission status for the data blocks (PDU) according to their identification, characterized
- 20 in that
- 25 the transmitter (T) is adapted to perform a synchronization with at least one first of said receivers (Ri), wherein a range of identifications of transmitted data blocks (PDU) is selected in said synchronization, and the transmitter (T) is adapted to delete the transmission status for the
- 30 selected range of identifications from the transmitter window.

16. Program unit loadable into a processing unit of a transmitter for a mobile communication system, wherein the transmitter is adapted to transmit data blocks (PDU) to a plurality of receivers (R1 – RM), said data blocks (PDU) being identifiable by an identification, and to receive status indications from the receivers (R1 – RM) whether a data block (PDU) is correctly transmitted, and wherein the transmitter (T) is provided with a transmission window comprising the transmission status for the data blocks (PDU) according to their identification, characterized in that the program unit comprises code for performing the steps of initiating a synchronization with at least one first of said receivers (Ri) and selecting a range of identifications of transmitted data blocks (PDU) in said synchronization, and deleting the transmission status for the selected range of identifications from the transmitter window, when executed in the processing unit.

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